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(54) **Wheel tire tread**

(57) A wheel tire (1) for use in a motorcycle, comprises a tread portion (2) formed with a plurality of projections or blocks outwardly extending therefrom, each of some of the blocks being formed with a recess (13). The ratio of the radial depth of each recess to the radial height of the corresponding block is preferably not greater than $\frac{1}{2}$, and in plan view the recesses may be of circular, triangular or other polygonal shape.
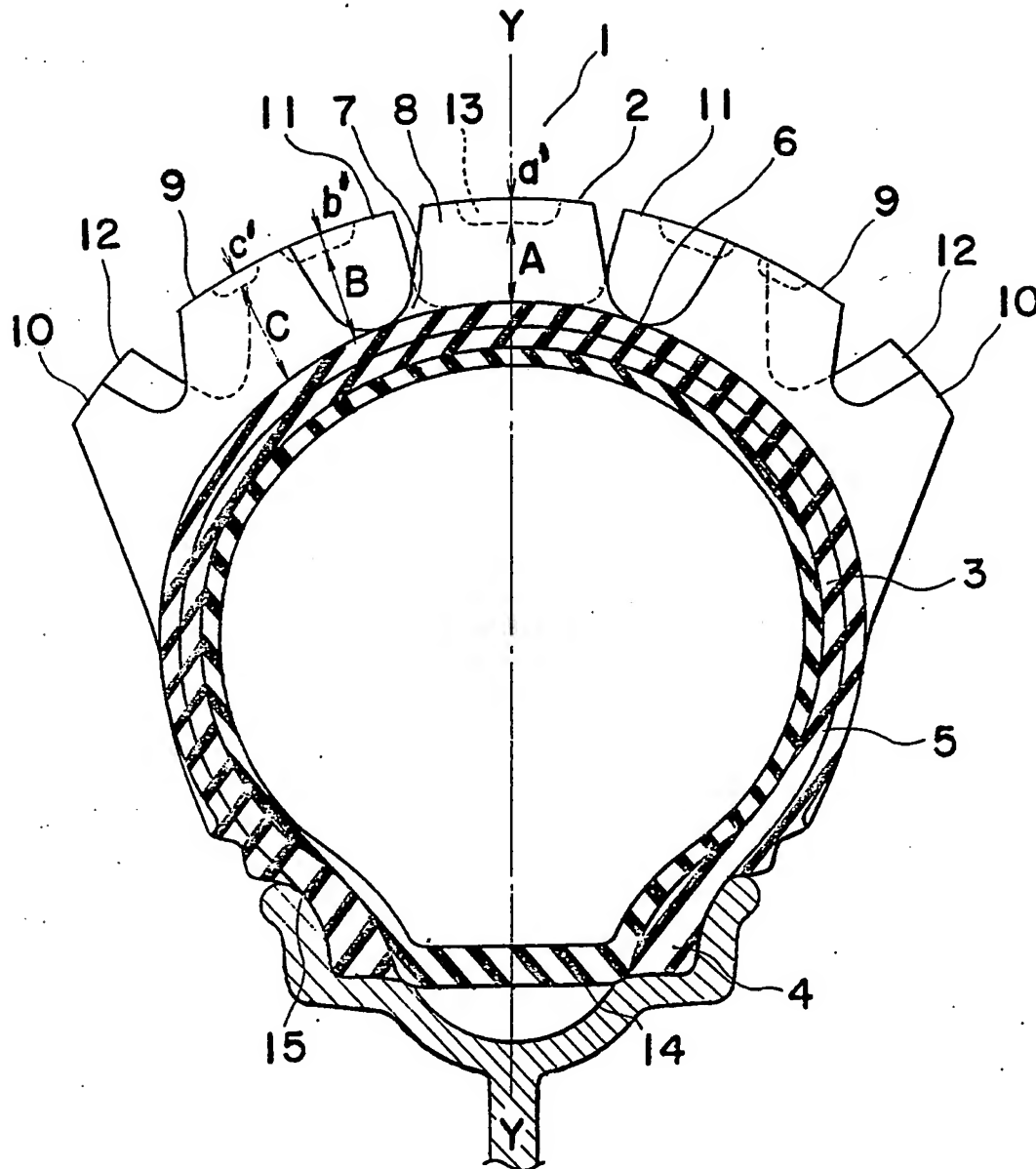

Fig. 3
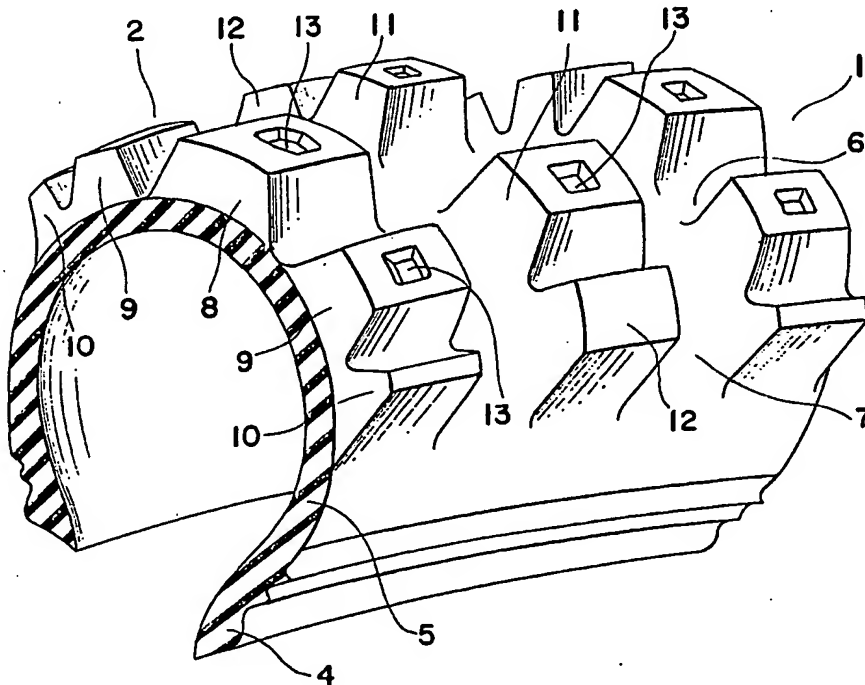
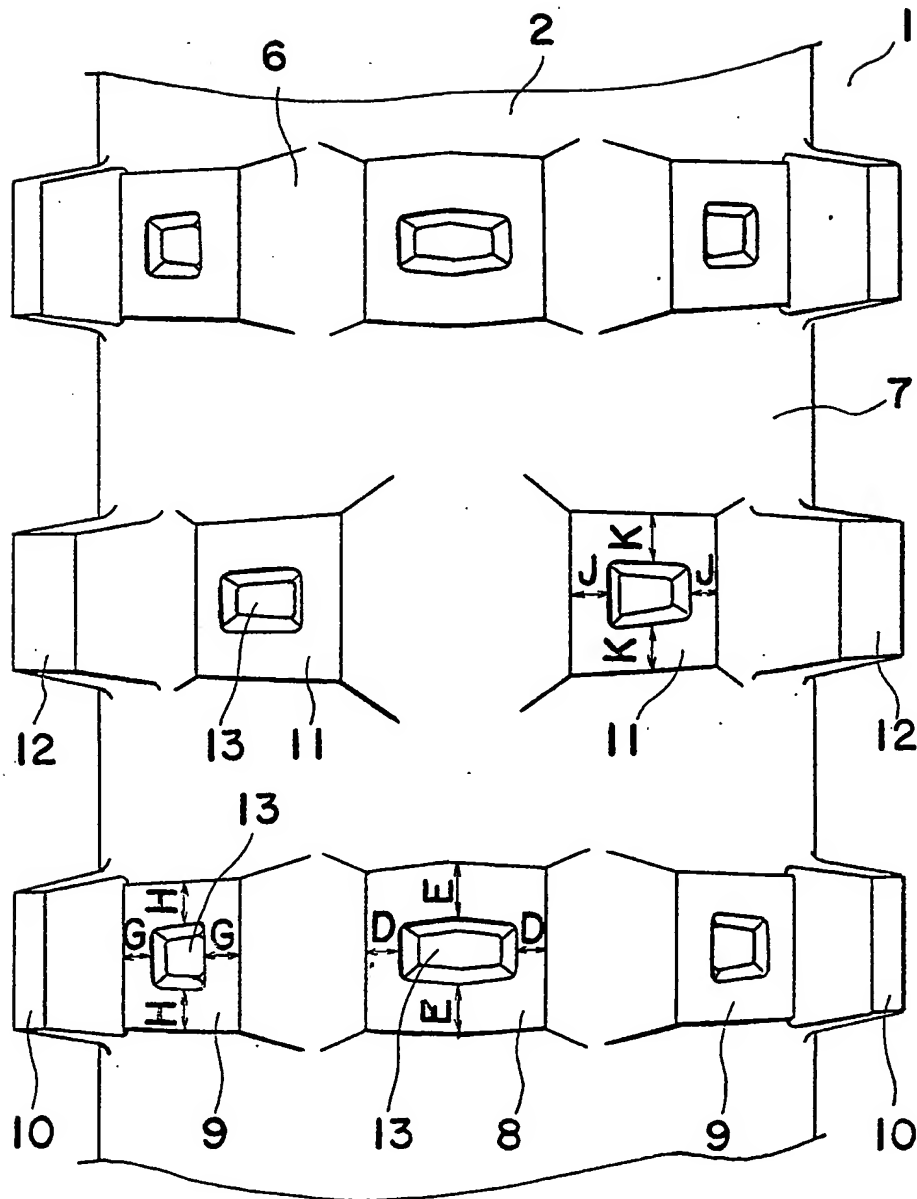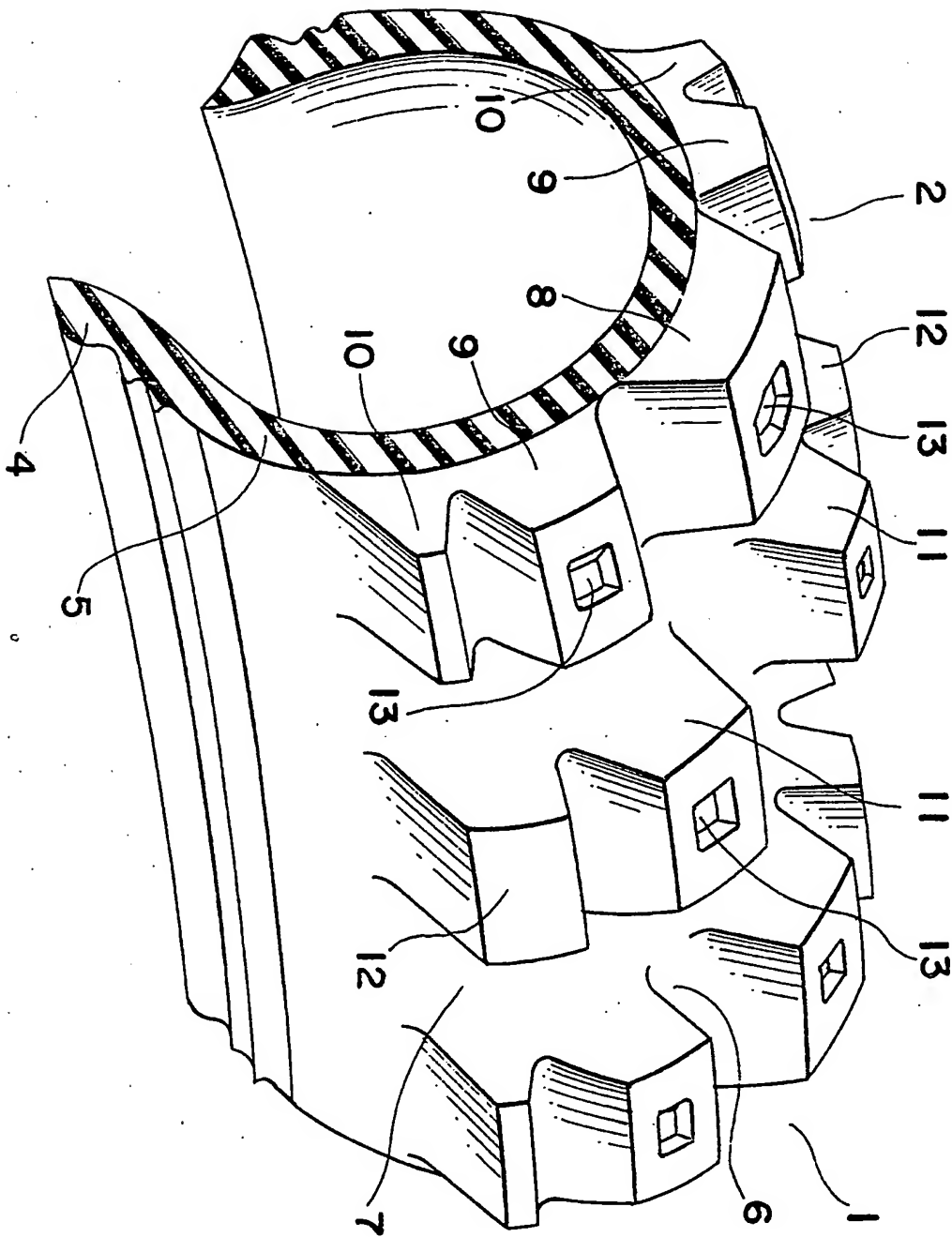GB 2 005 200 A

2005200

Fig. 1

2005200

Fig. 2

2005200

Fig. 3

SPECIFICATION
Wheel Tire

The present invention generally relates to wheel tires, and more particularly, to wheel tires
5 suited for use in motorcycles.

More specifically, the present invention pertains to the wheel tires of a type having a block-patterned tread, the terms "block-patterned" being to be understood as meaning
10 the pattern formed by a plurality of solid projections or blocks outwardly protruding from a tread area of the tire.

The wheel tire having the block-patterned tread is currently commercially available. In
15 particular, each of the solid projections or blocks outwardly protruding from the tread area of the conventional tire has a flat contact area adapted to contact the road surface. With this conventional wheel tire, improvement in holding
20 capability of the tire relative to the road surface has long been desired.

Accordingly, the present invention is intended to provide a wheel tire capable of exhibiting a relatively high holding capability relative to the
25 road surface by providing a recess preferably in each of the solid projections or blocks.

According to the present invention, since the projections or blocks have their recesses defined therein, the number of edges on the tread area of
30 the tire is increased with corresponding increase in holding capability of the tire relative to the road surface. This is advantageous in that the tire according to the present invention gives a relatively high braking performance. In addition,
35 the presence of the recesses allows the tire as a whole to be manufactured with less rubber material and, consequently to have a decreased weight.

These and other objects and features of the
40 present invention will become apparent from the following description taken in conjunction with a preferred embodiment thereof with reference to the accompanying drawings, in which:

Fig. 1 is a cross sectional view of a wheel tire
45 embodying the present invention;

Fig. 2 is a top plan view of a portion of the wheel tire shown in Fig. 1; and

Fig. 3 is a perspective view of that portion of the wheel tire shown in Fig. 2.

50 Before the description of the present invention proceeds, it is to be noted that like parts are designated by like reference numerals throughout the accompanying drawings.

Referring now to the accompanying drawings,
55 a wheel tire 1 particularly suited for use in a motorcycle comprises a tread area 2, a pair of side wall areas 5 opposed to each other and contiguous to both sides of the tread area 2, and a pair of bead portions 4 in which respective bead
60 cores are embedded as is well known to those skilled in the art. The wheel tire 1 further comprises any known carcass structure 3 held in position to face a known inner tube 14 positioned inside the wheel tire 1 and mounted on any

65 known wheel rim whose rim flanges are illustrated by 15 as engaged to the respective bead portions 4.

So far illustrated, the tread area 2 of the tire 1 has a plurality of blocks integrally formed
70 therewith and protruding outwards therefrom said blocks being defined by a plurality of grooves 6, extending circumferentially of the tire, and a plurality of transverse grooves 7 extending at right angles to the mid-circumferential plane lying
75 at right angles designated by Y—Y in Fig. 1, the blocks so defined being designated by 8, 9, 10, 11 and 12. The depth of each of the circumferentially extending grooves 6 is smaller than the depth of each of the transverse grooves
80 7. Of these blocks, the blocks 8, 9 and 11 are generally arranged in five rows in a direction circumferentially of the tire, the blocks 8 of one row, which extends in alignment with the mid-circumferential plane Y—Y being referred to as
85 center blocks; the blocks 11 of two rows, one on each side of the row of the center blocks 8, being referred to as second blocks; and the blocks 9 of the remaining two rows, one on each side of the row of the center blocks 8 and extending on one
90 side of the adjacent row of the second blocks 11 remote from the row of the center blocks 8, being referred to as third blocks.

In accordance with the present invention, one end face of each of the center, second and third
95 blocks 8, 11 and 9 opposed to the body of the tire 1 is formed with a recess 13 of predetermined depth extending inwardly of the corresponding block. So far illustrated, each of the recesses 13 defined in the center, second and third blocks 8,
100 11 and 9 is shown as having a generally rectangular shape, but may have any desired shape, such as circular or triangular or any other polygonal shape.

The recesses 13 defined in each of the center,
105 second and third blocks 8, 11 and 9 are preferably so dimensioned as to satisfy the following requirement:

$$a'/A = b'/B = c'/C < 1/2$$

wherein a' represents the depth of each of the
110 recesses 13 defined in the center blocks 8, b' represents the depth of each of the recesses 13 defined in the second blocks 11, c' represents the depth of each of the recesses 13 defined in the third blocks 9, A represents the maximum height
115 of each of the center blocks 8 less the depth a', B represents the maximum height of each of the second blocks 11 less the depth b' and C represents the maximum height of each of the third blocks 9 less the depth c'.
120 Furthermore, each of the recesses 13 in the center, second and third blocks 8, 9 and 11 has its opening defined on the end face of the corresponding block, the perimeter of said opening of each recess being preferably spaced a
125 distance of 4 to 10 mm. from the perimeter of the end face of such corresponding block. In particular, where each of the openings of the

recesses 13 in the center, second and third blocks
8, 11 and 9 is of a generally rectangular shape as
shown, the distance D between each of the
opposed circumferential sides of any one of the
5 openings of the recesses 13 in the center blocks 8
and the adjacent circumferential side edge of the
end face of such center block 8 and the distance E
between each of the opposed transverse sides
of said one of the openings of the recesses 13
10 in such center block 8 and the adjacent transverse
side edge of the same end face of such center
block 8, which may be equal to each other or
different from each other, are preferably within
the range of 4 to 10 mm. A similar description
15 concerning the distances D and E can equally
apply to the distances, such as designated by G
and H, in the third blocks 9 and those designated
by J and K in the second blocks 11 in Fig. 2.
  Although not shown, recesses similar to the
20 recesses 13 may also be formed in the blocks
other than the center, second and third blocks 8,
11 and 9.
  It is to be noted that, if each of the ratios, a'/A,
b'/B and c'/C, is greater than 1/2, the rigidity of
25 the corresponding blocks 8, 11 and 9 will be
reduced to such an extent that the traction force
which may be transmitted from the tire to the
road surface during the use of the tire will be
lowered and, also, the blocks will be susceptible
30 to damage. In the present invention, the
requirement of the ratios being 1/2 or less has
been selected in consideration of the situation in
which a fresh tire of the construction according to
the present invention can exhibit its maximum
35 possible performance before the recesses 13
disappear due to wear of a portion of each of the
blocks surrounding the corresponding recess 13.
This means that the tire of the construction
according to the present invention can
40 advantageously be used as a tire for use in a racing
motorcycle and, when and after used, can be used
in a motorcycle during motorcycle drive practice.
  It is further to be noted that, within the range
of 4 to 10 mm., each of the distances D, E, G, H, J
45 and K may be selected in consideration of the
surface area of the end face of the corresponding
blocks and the depth of each of the grooves
surrounding the blocks. According to a series of
experiments conducted by the inventor of the
50 present invention, it has been found that, if each
distance D, E, G, H, J and K is less than the
lowermost limit of 4 mm., a portion of each of the
blocks surrounding the corresponding recess 13
is susceptible to wear and/or cracking under the
55 influence of the increased surface area of contact
of the tire tread to the road surface and, on the
other hand, that if such distance is more than the
uppermost limit of 10 mm., any meritorious
effect, which should be brought about by the
60 employment of the recesses 13, is not observed.
  Although the present invention has fully been
described by way of example with reference to
the accompanying drawings, it is to be noted that
various changes and modifications are apparent
65 to those skilled in the art. By way of example, the

blocks 8 to 12 may not be always arranged in
such a pattern as illustrated, but may be arranged
in any desired pattern. Such changes and
modifications are, unless they depart from the
70 true scope of the present invention, to be
understood as included therein.

Claims
  1. A wheel tire for use in a motorcycle, which
comprises a tire body having a tread portion, a
75 pair of opposed side walls integrally extending
from respective side edges of said tread portion,
and a pair of opposed bead portions integrally
extending from respective free ends of the
individual side walls, said tire body including bead
80 cores embedded respectively in said bead
portions and a carcass structure embedded
therein, a plurality of blocks extending integrally
and outwardly from the tread portion to a
predetermined height, and a recesses of
85 predetermined depth defined in at least some of
the blocks and each extending inwardly of the
corresponding block.
  2. A wheel tire as claimed in claim 1, wherein
said at least some of the blocks are arranged in a
90 row extending in alignment with the mid-
circumferential plane of the tire in a direction
circumferentially of the tire.
  3. A wheel tire as claimed in claim 2, wherein
the blocks bearing the recesses are arranged in five
95 rows each extending in a direction
circumferentially of the tire, a first one of said
rows exteding in alignment with the mid
circumferential plane of the tire, second and third
ones of said rows extending on respective sides of
100 said first row of the blocks, and the remaining
fourth and fifth rows extending on respective
sides of the first row of the blocks and externally
of said second and third rows of the blocks.
  4. A wheel tire as claimed in any preceding
105 claim, wherein the ratio of the depth of each of
the recesses relative to the maximum height of
the corresponding block is 1/2 or less.
  5. A wheel tire as claimed in any preceding
claim wherein the opening defined by each recess
110 on the free end face of the corresponding block is
such that, the perimeter of said opening is spaced
a distance of 4 to 10 mm. from the periphery of
said free end face of said corresponding block.
  6. A tire for a motorcycle wheel having a tread
115 comprising protruding blocks at least some of
said blocks having a recess in an exposed end
face.
  7. A tire substantially as hereinbefore
described with reference to and as illustrated in
120 the accompanying drawings.

New claims or amendments to claims filed on
9:1:79
Superseded claims, 1
New or Amended Claims:—
125: 1. A wheel tire for use in a motorcycle, which
comprises a tire body having a tread portion, a
pair of opposed side walls integrally extending
from respective side edges of said tread portion, .

and a pair of opposed bead portions integrally
extending from respective free ends of the
individual side walls, said tire body including head
cores embedded respectively in said bead
5 portions and a carcass structure embedded
therein, a plurality of blocks extending integrally
and outwardly from the tread portion to a
predetermined height, and recesses of
predetermined depth opening on the free end
10 faces of at least some of the blocks and each
extending inwardly of the corresponding block,
the perimeter of each said recess being spaced a
distance of 4 to 10 mm. from the periphery of
said free end face of said corresponding block,
15 wherein the ratio of the depth of each of the
recesses relative to the maximum height of the
corresponding block is 1/2 or less.